

IN THE CLAIMS:

Amend claims 1-8, cancel claims 9-30 without prejudice or admission, and add new claims 31-37 as shown in the following listing of claims, which replaces all previous versions and listing of claims in this application.

1. (currently amended) A method of surface or cross-sectional processing and observation comprising:

a first step of processing at least one ~~desired~~ predetermined area in a surface of a sample to form a target surface or cross-section; and

a second step of observing the target surface or cross-section by scanning the target surface or cross-section with a probe of a scanning probe microscope and detecting a physical quantity produced between the probe and the target surface or cross-section, ~~thereby to observe the target surface or cross-section.~~

2. (currently amended) The method of surface or cross-sectional processing and observation of claim 1, ~~wherein said 1; wherein in the first step the desired area is processed by etching the desired area includes a substep of carrying out an etching process by irradiating the sample surface with a focused energy beam, thereby to expose the target surface or cross-section.~~

3. (currently amended) The method of surface or cross-sectional processing and observation of claim 2, ~~wherein~~ 2; wherein the focused energy beam is a focused ion beam.

4. (currently amended) The method of surface or cross-sectional processing and observation of claim 3, ~~wherein~~ said 3; wherein the first step includes a ~~substep~~ step of decomposing an organic metal gas with the focused ion beam in a predetermined location of the sample to make an electrode and an interconnect after carrying out the etching process with the focused ion beam.

5. (currently amended) The method of surface or cross-sectional processing and observation of claim 1, ~~wherein~~ said 1; wherein the first and second steps are carried out using a system for surface or cross-sectional processing and observation, ~~said the~~ the system having a unit for processing the surface of the sample to expose a target surface or cross-section thereof, and a scanning probe microscope unit for observing the target surface or cross-section.

6. (currently amended) A method of surface or cross-sectional processing and observation comprising:

a first step of processing at least one ~~desired~~ predetermined area in a surface of a sample to expose a target surface or cross-section;

a second step of removing a damaged portion remaining in the exposed surface or cross-section and then forming a stepped portion according to a difference in ~~material~~ materials among layers ~~constructing~~ forming the exposed surface or cross-section; and

a third step of observing the exposed surface or cross-section with a scanning probe microscope.

7. (currently amended) The method of surface or cross-sectional processing and observation of claim ~~6, further~~ 6; further comprising a step of finishing the exposed surface or cross-section into a mirror face before the stepped portion is formed.

8. (currently amended) The method of surface or cross-sectional processing and observation of claim ~~2, wherein~~ said 2; wherein the first ~~step of exposing the target surface or cross section with the focused energy beam and said~~ and the second ~~step of observing the exposed surface or cross section with the probe~~ are repeated sequentially.

9. - 30. (canceled).

31. (new) The method of surface or cross-sectional processing and observation of claim 1; wherein the physical quantity is a physical quantity relating to an electric and

magnetic solid state property of the sample such as an electrical conductivity, a dopant concentration, a dielectric constant, a potential, a leaking magnetic field, and a spin interaction of the sample.

32. (new) A method of surface or cross-sectional processing and observation of claim 1; wherein the physical quantity is a physical quantity relating to a mechanical solid state property of the sample such as a hardness, a friction, and an elasticoviscosity of the sample.

33. (new) A method of surface or cross-sectional processing and observation of claim 1; further comprising the step of observing a position of the probe using a microscope unit and controlling the position of the probe in accordance with observed information obtained from the microscope unit.

34. (new) A method of surface or cross-sectional processing and observation of claim 33; wherein the microscope unit comprises an optical microscope.

35. (new) A method of surface or cross-sectional processing and observation of claim 33; wherein the microscope unit comprises a scanning electron microscope.

36. (new) A method of surface or cross-sectional processing and observation of claim 2; wherein the focused energy beam is a focused ion beam.

37. (new) The method of surface or cross-sectional processing and observation of claim 7; wherein the step of finishing the exposed surface or cross-section into a mirror face is conducted by irradiating an electron beam in parallel with blowing of etching gas.